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Rapid Simulations: Caspian Learning Brings Immersive Learning to the Mainstream

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Introduction

Three-dimensional simulations¹ and serious games² have long been recognized as valuable teaching tools for corporate learning organizations. They enable learners to enter virtual environments that can mimic an impressive array of instructive, on-the-job scenarios and challenges that are impractical or impossible to offer on-demand in the real world.

The Boeing Company and various military branches are among the corporate and government entities that have employed customized 3D simulations in the past. Boeing, for example, has used simulations to train its staff of highly specialized engineers. The aerospace company recognizes that it cannot rely on universities to produce graduates with precisely the skills it needs – nor can it produce and reproduce at will the full range of real-world scenarios for which engineers need to be prepared. The answer? Boeing has created

¹ "Simulations" (or "sims") are abstractions created to focus attention on specific aspects of reality, dropping out all other aspects to sharpen that focus. In most cases, the point of a sim is to observe, deconstruct and, sometimes, to predict how a process works. Three-dimensional sims are one type of sim in which graphic technology is used to create a three-dimensional representation of space.

² "Games" are abstractions that may or may not reflect reality, and which set up a construct of rules that must be followed to achieve a desired outcome. The point of a game is to master the rules. "Serious games" are those for which the purpose is to support a business or organizational objective, such as training a skill.

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specialized schools of its own. At the center of those programs are simulations.

But even very large organizations have reserved this sort of learning solution for programs that are expected to have long shelf lives; the investment necessary for development of such learning solutions has been too great to put into short-term projects. For most organizations, the use of simulations and serious games has required too much time and money to consider at all.

These circumstances are changing. Specialty vendors are finding ways to streamline the custom development of simulations. For companies that already create or use such games, the latest products come with costs and infrastructure requirements that are low enough and turnaround times that are short enough to enable greater use. For those that have seen simulation as being beyond their reach, past obstacles will no longer be such a deterrent.

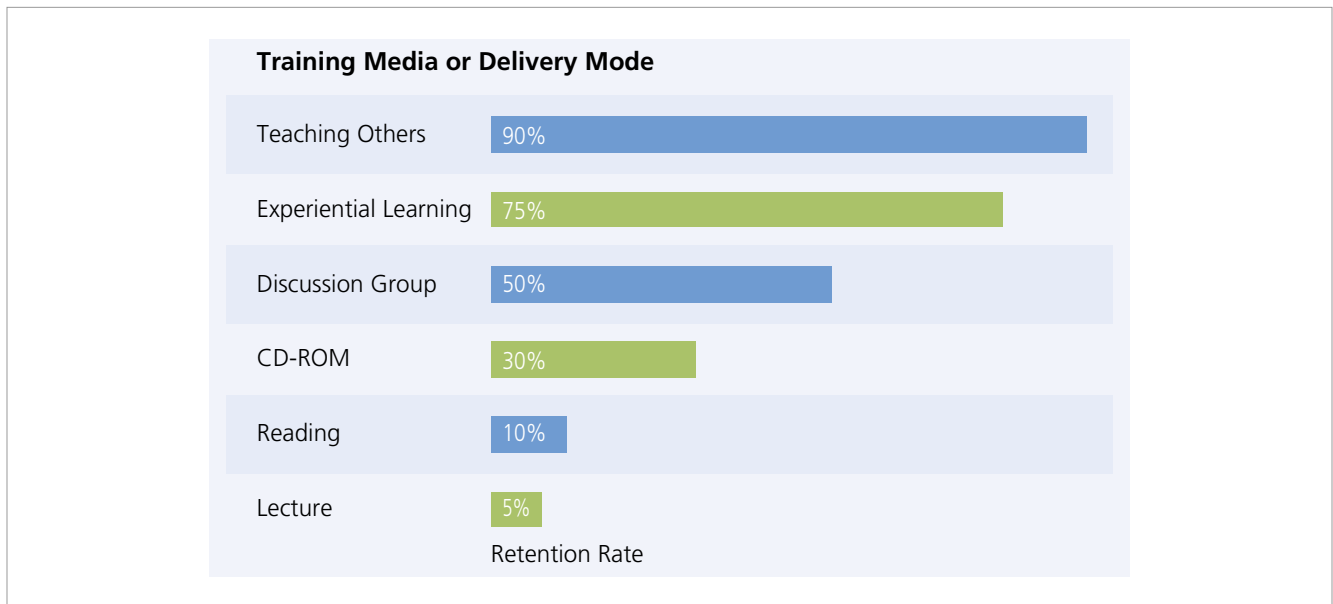
This research bulletin offers a look at how rapid e-learning has evolved, the appeal of rapid-simulation technology and what it can do. We also discuss the marketplace implications of the shift toward greater affordability. Finally, we highlight a leading provider and thought leader that is helping to drive the evolution toward rapid immersive learning – Caspian Learning and its flagship rapid-simulation environment, *Thinking Worlds™*.

This evolution is yet another example of the trend toward tools that enables rapid content creation in enterprise learning, as well as the trend away from traditional classroom instruction. A survey by Bersin & Associates in 2009 found that roughly 32 percent of companies were using rapid e-learning tools to create training materials.³

Among those likely to feel the impact are companies which want to incorporate custom simulations into internal learning programs, as well as vendors that want to make simulations a part of the overall learning solutions which they offer to their clients. Let us not forget learners

³ For more information, *The Corporate Learning Factbook® 2010: Benchmarks, Trends and Analysis of the U.S. Corporate Training Market*, Bersin & Associates / Karen O'Leonard, January 2010. Available to research members at www.bersin.com/library or for purchase at www.bersin.com/factbook.

Figure 1: Value of Experiential Learning⁴



Source: Bersin & Associates, 2009.

themselves, who may soon do more of their training in tailor-made virtual worlds rather than in classrooms.

The Appeal and Evolution of Simulation Solutions

Several forces are driving the movement in enterprise learning toward rapid e-learning in general, and interest in simulation in particular. One of those forces is the changing demographics of the workforce. Younger workers, without a doubt, are more drawn to e-learning environments that are user-directed, social, visually exciting, interactive and immersive than they are to traditional classroom instruction. Furthermore, younger workers are often attracted to games-based activities and their expectations of digital media are high.

But you do not have to be a Millennial⁵ to respond to the aspects of immersive learning, including simulations, that make it effective.

⁴ For a detailed discussion of all of the options for the design of blended-learning programs, *The Blended Learning Book: Best Practices, Proven Methodologies, and Lessons Learned*, Josh Bersin, Pfeiffer, October 2004. Available for purchase at www.bersin.com.

⁵ "Millennials" (also known as "Generation-Y") are those individuals who were born between 1981 and 2000, and are culturally known to be confident, impatient, socially conscious, family-centric (or "tribal-oriented") and technology-savvy.

First and foremost, simulations offer experience, a key component in building mastery.

Experiential Learning Leads to Mastery

“Mastery” (as we define it in *The Blended Learning Book*⁶) is a combination of proficiency and retention – meaning that a true master is not only proficient (*he / she could pass any test*), but that master has the ability to retain and apply the knowledge in a wide range of conditions. When you leave a class, you may feel like a master because you passed a test. But only after you apply the information learned dozens of times in varying conditions do you truly come close to being a master.

Our research from *The Blended Learning Book* found that people retain only 10 percent of what they read, 20 percent to 30 percent of what they hear, and almost 50 percent of what they learn through discussion and interaction. When we add direct experience to that mix (i.e., on-the-job experience with real risks and the danger of making mistakes), the retention and application level increases to 75 percent or more.

Not surprisingly, experiential learning is generally regarded as the most effective route to true mastery of a skill or concept. But, as David Kolb’s model⁷ of the experiential learning cycle illustrates⁸, the best environments for experiential learning afford opportunities for observation and reflection along the road to mastery, as well as repetition – and perhaps trial and error in new situations. Real life does not generally offer pause and rewind options. In real life, errors do not always lead to a second chance. So in some ways, for learning purposes, a good simulation can be superior to the real world.

⁶ For more information, *The Blended Learning Book: Best Practices, Proven Methodologies, and Lessons Learned*, Josh Bersin, Pfeiffer, October 2004.

⁷ For more information, see the works of David Kolb <http://www.infed.org/biblio/bexplrn.htm>.

⁸ For more information, *Experiential Learning for Leadership Development: Approaches, Best Practices and Case Studies*, Bersin & Associates / Kim Lamoureux, May 2010. Available to research members at www.bersin.com/library.

engage the learner in the content to be learned. Interestingly enough, the entertainment value of the simulation does not seem to have a significant influence on learning.

Evolution of Simulations

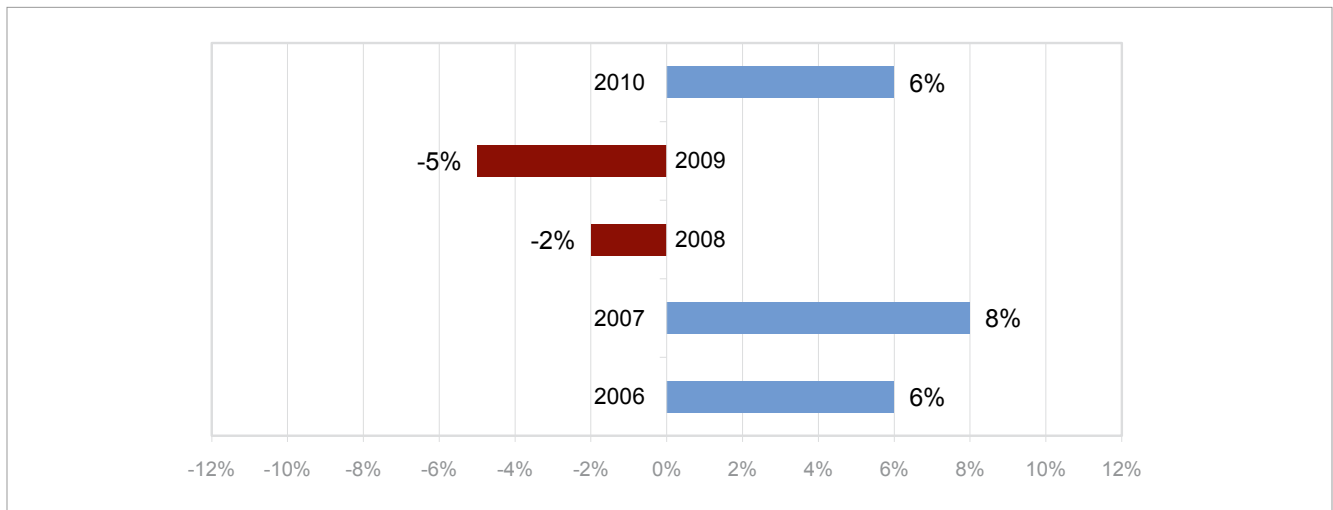
Simulation technologies and products have evolved in recent years from the relatively simple to the very sophisticated to answer various needs. Application simulation tools, such as Adobe Captivate, are a popular example. Such tools create the illusion of working in software applications, so that new users can learn to navigate interfaces and workflows without a live instructor. A different sort of example comes from Toolwire¹¹, whose products let learners of complex information technology systems practice on live, working, but virtual, iterations of those systems that can be preset to malfunction in educationally significant ways and then quickly reset for the next cohort of learners.

Then there are the increasingly prevalent worlds of 3D simulations, virtual role-playing and serious games – in which animation technologies make it possible to offer ever-richer and more memorable interactive learning experiences. But, until recently, custom simulations in this vein have been out of reach financially for most learning organizations. At the same time that companies have faced challenges to present learning content in more sophisticated, interactive formats, they have been under great pressure to spend less. As shown in Figure 3, Bersin & Associates' research¹² has found that U.S. companies' spending on training has plummeted in recent years. Tools that enable rapid development of learning solutions trim the manpower hours needed to add offerings, and therefore the cost.

¹¹ Source: www.toolwire.com.

¹² For more information, *The Corporate Learning Factbook® 2011: Benchmarks, Trends and Analysis of the U.S. Training Market*, Bersin & Associates / Karen O'Leonard, January 2011. Available to research members at www.bersin.com or for purchase at www.bersin.com/factbook.

Figure 3: Year-over-Year Change in Training Staff 2006 to 2010 – U.S. Total



Source: Bersin & Associates, 2010.

Caspian Learning and Thinking Worlds

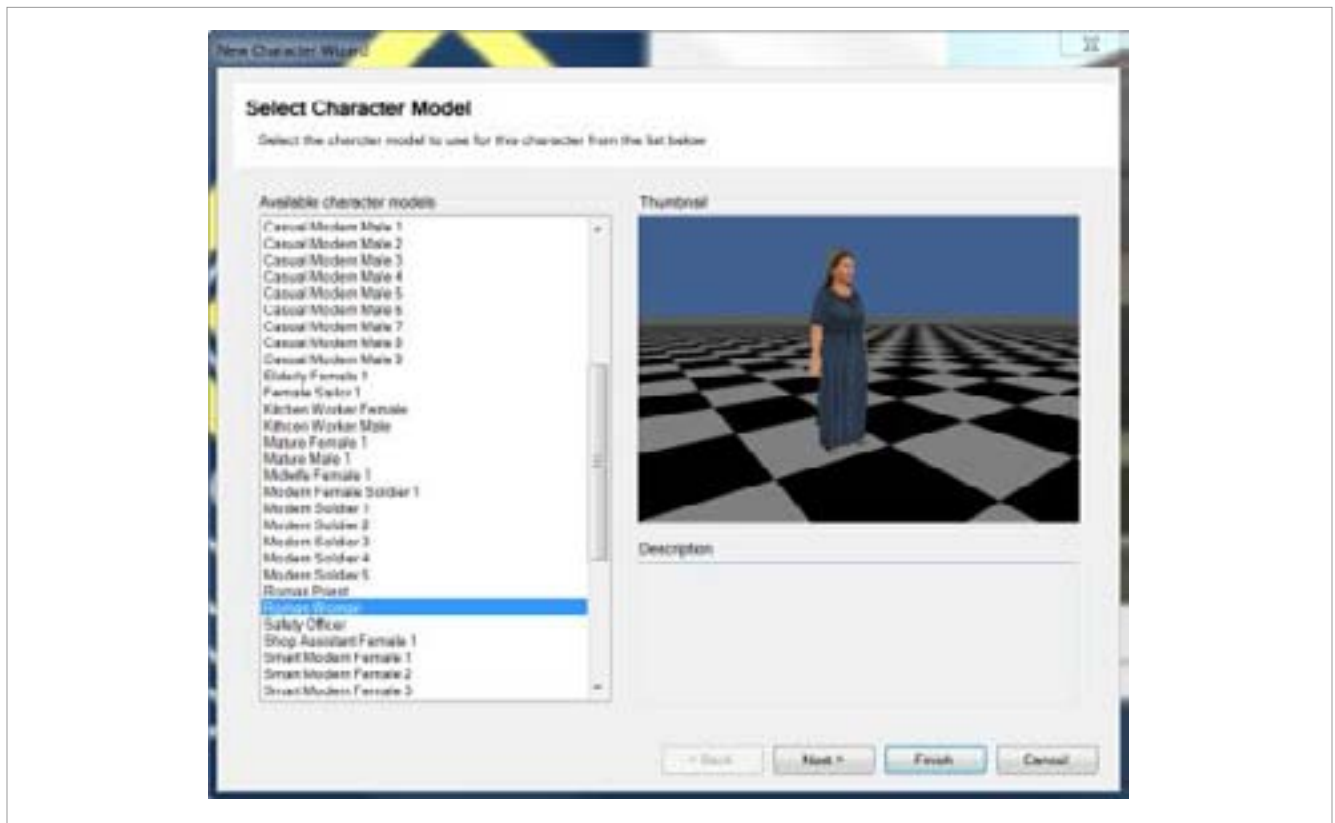
Two neuroscientists founded U.K.-based Caspian Learning in 2002 with a goal of developing exceptionally engaging training and educational software. In particular, the company sought to make customized serious games that would incorporate high-quality 3D simulations and which would be affordable for as wide an audience as possible.

Figure 4: Caspian Places Immersive Learning at the Convergence of Three Technologies



Source: Caspian Learning, 2010.

Figure 5: A Library of Characters from Which to Choose



Source: Caspian Learning, 2010.

In pursuing those goals, Caspian has not just been a solution provider – but a thought leader on the psychology of learning. According to Caspian, the success of the learning experience hinges largely on whether a learner is fully engaged and motivated.

As Caspian’s CEO recently stated:

“Whilst we are all clear that motivation is not sufficient [alone] to get learning improvement ... it is a necessary element and it is often forgotten. Quite often, we get involved in learning focused on the endpoint, focused on the business improvements and process goals we want to achieve, but forget about the fact that along that journey we need to ensure that we have learner attention and, critically, learner motivation. Without that, we will not reach our goals.”

Research by Caspian¹³ has identified several key principles to keep in mind in the quest to achieve maximum learner motivation which include the following.

- **Intrinsic Motivation Is More Powerful Than Extrinsic Motivation** – External rewards, such as a bonus or promotion, can help to drive someone’s desire to learn. But learning success increases even more when a person finds the experience of learning itself to be intrinsically rewarding. Examples of intrinsic motivators include the thrill of competition or the satisfaction of achieving a goal. These emotions can propel a learner through even a relatively pointless video game. Bringing a learner’s emotions into play in a serious game is just good instructional strategy.
- **Autonomy Is Important: People Want to Feel In-Control** – This principle sits at the heart of why the use of avatars is effective. People like to identify with a virtual version of themselves and then steer themselves through a challenge. Passive learning environments are far less effective.
- **Self-Confidence and Self-Belief Matter, and Can Grow through Practice** – One of the advantages of role-playing in a virtual world is the opportunity it offers to build confidence before attempting tasks in the real world. Failure in a simulation can occur without dire consequences and can be simply a learning experience. For example, Caspian reports that sales representatives who practiced client conversations and customer care in a serious game built for Volvo gained real-world confidence.
- **Goals Are Key and Especially Valuable if Set by the Learners Themselves** – Good, serious games are full of goals, small and large – and players in virtual worlds have a say in which goals they pursue, which corner to turn and which challenge to undertake. Goals provide learners with a direction and an incentive to follow through to achievement. Goals set by a learner tend to inspire more persistence than goals set *for* a learner.

¹³ Source: *Games, motivation & learning: Motivation matters, Prevalence of play, Games and motivation, & Conclusion*, Caspian Learning / Donald Clark, 2007. Available at: <http://www.caspianlearning.co.uk/results/evidence-that-games-and-ilss-work>.

- **The Right Degree of Challenge Is Important in Building Self-Confidence** – Achieving a goal that requires little or no effort leaves a learner roughly as self-confident as he / she was before achieving that goal. On the other hand, facing an impossible goal can leave a learner less confident. The best serious games introduce challenges that are incrementally more difficult, offering an opportunity to practice and build skills, as well as a true sense of achievement.
- **Feedback Is Necessary along the Path toward a Goal and Immediate Feedback Is Particularly Valuable** – In a virtual-world simulation, a learner who succeeds or fails at a given task can find out immediately, and then adjust efforts for a second try, if needed. This is generally far more valuable than delayed feedback in guiding learning.
- **Social Approval or Disapproval Can Affect How Someone Learns** – People naturally act in ways that they think will earn the approval and avoid the disapproval of others who matter to them. Serious games, as well as learning programs in general, can enhance a learner's motivation by offering opportunities to do both.

Thinking Worlds

In 2009, Caspian released Thinking Worlds 3.0, a product that does more than enable Caspian to develop serious games for clients quickly and affordably. It offers a framework that its clients can use to author the simulations themselves – and do so with impressive speed.

Configured to let artists and designers do much of what used to be the exclusive domain of programmers, Thinking Worlds makes it possible to handle 80 percent or more of serious game development without having to write a line of code. Once created, each customized game is deliverable via a web browser, CD-ROM download or even as a mobile application. Each game allows learners to select and personalize an avatar through which to navigate through a virtual environment. The game can incorporate information from a company's learning management system, as well as feed information back into that system.

Thinking Worlds simulations have been put to use in a wide range of applications. For example, the U.K.'s Royal Navy Maritime School used a

simulation and serious game that Caspian developed to teach sailors to perform faster and to conduct better inspections aboard ships, as well as to prepare trainees for a seafaring life. The school saw a 50 percent reduction in the need for remedial training after using the product.

Figures 6 through 9 offer examples of learning scenarios created with Thinking Worlds.

Figure 6: Sample Screenshot – Used to Train Police on Search-and-Seizure Procedures



Source: Caspian Learning, 2010.

Figure 7: Sample Screenshot – A Prototype Developed to Build Customer-Service Skills



Source: Caspian Learning, 2010.

Figure 8: Sample Screenshot – View of the Rotterdam Seaport from the E.U. Customs Drug Precursor Identification Training Program



Source: Caspian Learning, 2010.

Figure 9: Sample Screenshot – The Ufi LearnDirect Worker-Readiness Program



Source: Caspian Learning, 2010.

The simulation in the Royal Navy solution was oriented toward an exploration of the relevant areas and tasks, while the serious game introduced an element of competition and imposed consequences for failure, including a visual of the ship exploding. Interactions and activities within the dual solution included the following:

- Conversations with characters which might hinder inspections or pose a threat;
- Solving puzzles with a relationship to problem-solving that might be necessary on the job;
- The collection or identification of objects required to complete inspections;
- Labeling 3D schematics to show a command of the relevant areas; and,
- Exploration of virtual worlds in which choosing the wrong route might bring negative consequences.

Case in Point: Interplay Energy

One of Thinking World's newest users is Interplay Energy, a three-man startup that has used the software to develop virtual training and virtual field-testing on how to audit homes for energy efficiency. The company expects to market its virtual solutions to organizations that train or test people who are pursuing efficiency-auditing certifications. Such organizations range from private companies to community colleges and standard-setting bodies.

Demand for energy-efficiency training is rising with the advent of government incentives for contractors who adhere to green construction standards and homeowners who make green upgrades. To qualify for incentive programs, contractors must earn an auditing certification to demonstrate that they understand the measures that can make a home energy-efficient, as well as how to ensure safety. Upgrades can create hazards, for example, if combustion appliances, such as water heaters and furnaces, are set up improperly in tighter spaces.

To date, trainers and testers have relied on the use of actual homes that they rent, borrow or buy. That gets expensive and limits the range of scenarios that certification seekers can experience before taking their new knowledge to market. It also

Case in Point: Interplay Energy (cont'd)

can create a bottleneck, as only so many certification seekers can test in a home per day. Hoping to craft a better solution through simulation, Interplay approached Caspian.

The entrepreneurs were thrilled to discover Thinking Worlds – an affordable option that enabled speedy development, even without a dedicated developer on the company payroll. Ultimately, Interplay expects to hire a full-time developer to work with Caspian, which is probably more ideal, but the company was pleased to find that Caspian was able and willing to work on the project immediately.

One of Interplay's co-founders stated,

"We're more energy experts than we are development experts, as you can imagine, and so [Caspian is] basically developing it alongside us. We're very involved in how it's shaped and what it looks like, but we're using the Thinking Worlds skeleton to build it. Frankly, [Caspian's] quote was a third of what we saw in the marketplace because of their ability to use that framework ... and their time to market was considerably faster, probably twice as fast."

Figure 10: Sample Image – Interplay Energy's Efficiency Auditing Simulation



Source: Caspian Learning and Interplay Energy, 2010.

Case in Point: Interplay Energy (cont'd)

The first step was for Interplay to educate its contacts at Caspian on the subject matter, explaining through several long phone calls the process of conducting an energy-efficiency audit and the variables that can come into play. Interplay also provided documentation on standards that certification seekers must meet, as well as slide presentations and videos to offer illustrations on what was envisioned. That took a month or so. From there, the process involved mostly fine-tuning the prototype. The simulation will place certification seekers in a virtual home in which they can open and close doors, check insulation and appliances and, overall, experience limitless scenarios that they might encounter in real homes.

Along the way, Interplay reached out to subject matter experts, trainers and standards-setters in energy efficiency to confirm the perception that the market would be receptive to a simulated solution as an alternative to real-life field testing. Responses were positive enough to stir aspirations of providing simulations for other kinds of green jobs training.

As one of Interplay's co-founders commented,

"Basically we foresee a ton of green training being needed in the next decade, and simulation could really accelerate that. A lot of these field tests are really intellectual exercises more than, you know – like with a mason building a wall – cases where you truly have to touch and feel what you're doing. And in these cases where it's the intellectual exercise that's so important, that's where simulation is particularly strong." ~

Conclusion

In the past, small and midsize organizations (and even many that might be considered large) have dropped the idea of using 3D simulation and serious games as soon as they learned of the investment which development would require. Long development cycles, short shelf lives, special infrastructure requirements and huge overall costs were often obstacles too big to overcome. With the advent of rapid authoring tools, such as Caspian Learning's Thinking Worlds, that is fundamentally changing.

It is important to note that 3D simulations and serious games are not a replacement for all other types of learning. But there are many learning situations for which these tools offer a tremendous advantage, making them well worth considering as an addition to a learning organization's toolbox.



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